



## Select Committee on Defence Memoranda

### Annex C

#### Investment at the Atomic Weapons Establishment

##### Background

1. In the early 1950s, the main research and development activity in support of the UK's atomic weapons programme were transferred from Fort Halstead near Sevenoaks to a former air base near the village of Aldermaston in Berkshire. Since then, all the UK's atomic and nuclear weapons have been designed and manufactured by the Atomic Weapons Establishment (AWE, formerly Atomic Weapons Research Establishment) on this site and a neighbouring facility near Burghfield.

2. In 1993, AWE moved from its position as a Government establishment to one which was still Government-owned but operated by a private contractor. Nuclear licensing was introduced in 1997: site licenses and discharge authorities for Aldermaston and Burghfield were granted by the Nuclear Installations Inspectorate and the Environment Agency. This brought the AWE sites under the same regulatory controls as the civil nuclear industry. On 1 April 2000 - co-incidentally, fifty years to the day after its foundation - and following a competition, the Ministry of Defence placed a contract with a new company, AWE Management Limited (a consortium comprising Lockheed Martin, Serco and BNFL) to manage and operate the two sites at Aldermaston and Burghfield. The contract was initially awarded for an initial period of 10 years with an option to extend to 25 years with access to private finance. This option was taken up in 2003.

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##### Capability at the Atomic Weapons Establishment

3. A major feature of this new contract was for the replacement of many of the major science, manufacturing and assembly facilities on the two sites. This was driven by three factors. First, over 80% of the infrastructure at Aldermaston and Burghfield pre-dates 1960 and was becoming increasingly difficult and expensive to sustain. Second, the introduction of a moratorium on nuclear weapons testing required the introduction of significant new methods to underwrite the safety and reliability of the UK's nuclear weapons stockpile. This is all the more important as the UK is the only recognised Nuclear Weapon State whose nuclear deterrent is wholly dependent on a single warhead design. As has been reported in detail elsewhere<sup>[1]</sup>, the UK has introduced a major science-based programme to ensure we can retain the current very high levels of confidence in the safety and performance of the stockpile. This approach requires investment in a range of new facilities, such as super-computers, high energy lasers and hydrodynamics facilities. The nuclear regulatory regime also rightly imposes stringent safety requirements on the establishment itself, which are increasingly challenging to meet without additional investment in facilities built to modern safety standards.

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4. When AWE ML's initial contract was awarded, it was recognised that a detailed appraisal would be required of the condition of the infrastructure and skills base within

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the establishment to ascertain whether this was sufficient to deliver the requirement set out in the 1998 Strategic Defence Review, specifically:

*"For as long as Britain has nuclear forces, we will ensure that we have a robust capability at the Atomic Weapons Establishment to underwrite the safety and reliability of our nuclear warheads, without recourse to nuclear testing. There are no current plans for any replacement for Trident, and no decision on any possible successor system would be needed for several years. But we have concluded that it would be premature to abandon a minimum capability to design and produce a successor to Trident should this prove necessary."*[2]

5. This appraisal has now been completed and the Written Ministerial Statement made by the Secretary of State for Defence on 19 July 2005 marked the end of the process to agree contract amendments with AWE ML to deliver the new programme.

### **The Future Programme at the Atomic Weapons Establishment**

6. Under the revised contract the Ministry of Defence intends investing on average an additional sum of some £350M per annum at AWE over each of the next three years. The objective of this investment will be to sustain the core capabilities required to meet the MOD's requirements. The programme falls into three broad categories: upgrading of a range of research facilities to underpin the science programme that enables AWE to underwrite the safety and performance of the warhead; the refurbishment of some of the key infrastructure on the sites; and investment in sustaining core skills within the Establishment.

### **Science Facilities**

7. The programme at AWE is focussed on providing assurance of the safety and effectiveness of the UK's stockpile of operational warheads for use on the Trident D5 missile. To provide assurance of warhead safety and reliability without undertaking full-scale testing, scientists must be able to demonstrate their understanding of the physical and chemical processes that occur within the warhead. In addition, age-related changes must be investigated and the implications understood. Computer simulations are used to predict the effect of future changes and warheads are routinely withdrawn from the operational stockpile for forensic examination, which further improves the accuracy of these simulations. The specific capabilities required to undertake this assurance work fall into three main areas - high performance computer simulation, hydrodynamics and high energy density physics. Experiments and models are used to test theoretical understanding of the scientific principles and processes involved. This warhead assurance work represents the core activity presently undertaken at AWE.

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8. Particular projects to be taken forward include concept and design studies for the replacement of major facilities for hydrodynamics experiments; and the development of a new high energy laser facility (Project Orion).

### **Manufacturing, Assembly and Disassembly Facilities**

9. Much of the basic infrastructure at AWE (such as the heating and electrical systems and a considerable percentage of the office accommodation) dates back to the 1950s and is increasingly expensive and inefficient to operate. A great deal of the additional investment will therefore focus on refurbishment work in this area. In addition, AWE are required to ensure that we can sustain the Trident warhead in-service throughout its operational life, and also that the warhead can safely be taken out of service at the end of

its service life. It is possible that during the in-service life of a warhead, faults can emerge in components as they age. In extremis, this may require the remanufacture of new replacement components in order to ensure the safety and performance of the overall warhead. It is therefore necessary that AWE sustain a basic capability to remanufacture key components of the Trident warhead. Moreover, when the time comes to withdraw the Trident stockpile, a range of skills and facilities will be required safely to disassemble the warheads.

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10. An additional focus of the programme at AWE will therefore be to replace or refurbish some of the basic assembly and disassembly facilities at Aldermaston and Burghfield. These will include new facilities for handling high explosives and highly enriched uranium, modernisation of the assembly/disassembly facilities at Burghfield, and facilities for non-nuclear components in the warhead.

### Investment in Skills

11. The average age of the workforce at AWE has been increasing, as the generation recruited to meet the initial requirements of the Chevaline and Trident programmes near the end of their careers. There is therefore a requirement to recruit new members of staff to ensure that the core skills within AWE are sustained. Other new staff will be required to assist the infrastructure sustainment programme and also to operate the new facilities as they come on stream. We have therefore started a programme of recruitment and it is planned to increase the current workforce by around 350 staff per annum until 2007/08, of whom some 70% will be Non-Industrial staff and 30% Industrial staff.

### Summary

12. For as long as the UK remains committed to retaining a nuclear deterrent, it is essential that we ensure our stockpile of nuclear weapons remains safe and effective. This programme of additional investment in skills and infrastructure will ensure that this is achieved, against the background of the additional demands placed on AWE by the current and future regulatory regime, the introduction of the moratorium on underground nuclear tests and the increasing age of the Trident warhead stockpile, and of the scientists and engineers who support it.

13. This additional investment at AWE is required to sustain the existing warhead stockpile in-service irrespective of decisions on any successor warhead. The investment will sustain core skills and facilities that could also be used in future to develop a successor but no decisions have yet been made either in principle or practice on this issue.

*November 2005*

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1 O'Nions, Pitman and Marsh, Nature Volume 415 page 853 21 February 2002 [Back](#)

2 Supporting Essay 5, Strategic Defence Review: July 1998 [Back](#)



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